

RESEARCH PAPER

Smoking too few cigarettes to be at risk? Smokers' perceptions of risk and risk denial, a French survey

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Background: Past studies on smokers' risk perception have produced mixed results. We endorsed a new approach to assess smokers' perceptions of risk by asking them to estimate threshold values for the cancer risk associated with daily consumption of tobacco and number of smoking years. We expected that many smokers would endorse a "risk denial" attitude, with threshold estimates higher than their own smoking consumption and duration.

Methodology: A French national telephone survey (n=3820; 979 current smokers) included several questions about smoking behaviours and related beliefs.

Results: Among current smokers, 44% considered that smoking can cause cancer only for a daily consumption higher than their own consumption, and an additional 20% considered that the cancer risk becomes high only for a smoking duration higher than their own. Most smokers also agreed with other "risk denial" statements ("smoking is not more dangerous than air pollution," "some people smoke their whole life but never get sick"). Those who considered they smoked too few cigarettes to be at risk were less likely to report personal fear of smoking related cancer.

Conclusion: Risk denial is quite widespread among smokers and does not simply reflect a lack of information about health risks related to tobacco. Fully informing smokers about their risks may necessitate changing the way they process information to produce beliefs and limiting their capacity to generate self exempting beliefs.

Do smokers realise how much they endanger their health? A vast body of literature documents smokers' perceptions of risk, but the overall picture remains unclear: results from different studies are often inconsistent among each other showing either overestimation or underestimation of smoking related risks among smokers.^{1–8} There are two common ways of assessing smokers' risk perception in population surveys: the first one is to ask respondents to directly give a numerical risk estimate; the second one is to ask them to give a comparative assessment of their own individual risk relative to that of a non-smoker or of an "average" smoker. During the 1980–1990s, several studies using the direct numerical approach found a substantial overestimation of health risks related to smoking among smokers.^{9–11} However, clear conclusions could not be drawn from these studies because of a number of methodological shortcomings. Results happened to be quite different depending on whether the quantitative assessment of risk used proportions or, alternatively, percentages, and whether respondents were asked to assess one specific tobacco related risk independently of other health risks or in the context of multiple competitive risks (lung cancer, car accident, suicide, homicide, etc).^{12–14} Moreover, these studies frequently asked respondents to assess the risk for an average, anonymous smoker, not for themselves (for example "Among 100 cigarette smokers, how many of them do you think will get lung cancer because they smoke?"). Such a way of questioning is clearly inappropriate to capture the so called "optimism bias," which is well known in the psychological literature: individuals who exhibit risky behaviours usually believe that their own risk is lower than the risk faced by other individuals sharing the same behaviour.^{2 15}

Nevertheless, either giving a numerical risk estimate or comparing one's risk with someone else's are quite complex cognitive tasks. Both approaches equate risk with probability, while lay people usually perceive risk as a mix of probability

and severity of outcomes, not to mention other qualitative elements.¹⁴ Moreover, lay people may have an intuitive understanding of probabilities that guide them in their daily life without being able to formulate it explicitly.¹⁶ In the present study, we endorsed an alternative approach to assess smokers' perceptions of risk. Smokers were rather asked to estimate threshold values about the cancer risk associated with daily consumption of tobacco and number of smoking years. More precisely, smokers were asked, according to them, how much daily consumption of cigarettes may cause cancer, and for this given level, which smoking duration corresponds to a high risk of cancer? We assumed that smokers were more familiar with such estimations than with quantifying or comparing probabilities, and we expected that many among them would give estimates higher than their own personal smoking consumption and duration. Indeed, previous studies found that smokers are prone to endorse opinions such as "you have to smoke a lot more than I do to put your health at serious risk" or "I have not smoked enough time to be exposed to smoking related diseases."^{17–19} Similar opinions have been spread for decades by the tobacco industry.²⁰ Such statements have been labelled as "self exempting beliefs" or "risk denial," and they may help smokers to relieve fear and anxiety that may be associated with the detrimental consequences of their habit for their own health.^{17–19 21} The study of self exempting beliefs may improve our understanding of the prevalence and consequences of the "optimistic bias" mentioned above²²: such beliefs may help smokers to have self convincing arguments in order to rate their own risk as lower than the risk for smokers in general.

In this paper, we report on a national telephone survey conducted in 2005 among the French general population of 16 years of age and over: the Cancer Knowledge, Attitudes,

Abbreviations: Cancer KABP survey, Cancer Knowledge, Attitudes, Beliefs, and Practices survey; CATI, Computer Assisted Telephone Interview

Beliefs, and Practices (Cancer KABP) survey. Firstly, we investigated how smokers perceive the risk of tobacco related cancer in terms of daily consumption and duration thresholds, and their perceptions were compared to their own tobacco consumption and smoking duration. The resulting profiles were studied with regard to other smoking related beliefs and behaviours that may be related to smokers' risk denial. Secondly, we investigated the sociodemographic factors associated with various profiles of risk denial, and we assessed the effect of smokers' risk denial on their personal fear of smoking related cancer.

METHODS

Sample

The Cancer KABP survey is a telephone survey that was conducted in April–June 2005. Interviewers from a professional survey firm dialled an equal probability sample of fixed telephone numbers in France to identify residential households. In order to improve the response rate, selected households were forewarned by a letter announcing the survey. Within each household, one French speaking person aged 16 or more was randomly selected using the "next birthday" method (that is, the investigator asked which person had his birthday closest in the future). Because the legal age for adulthood is 18 in France, a special authorisation was obtained to include in the sample respondents aged 16 and 17. Eligible respondents were asked to complete a telephone interview with the Computer Assisted Telephone Interview (CATI) system. Overall, 75% of contacted household agreed to participate and 86% of selected individuals completed the questionnaire, resulting in a sample of 4046 respondents. Individuals with a history of cancer ($n = 226$) completed a shorter questionnaire and were excluded from the present analysis. Among the remaining participants ($n = 3820$), 979 reported smoking at least occasionally. The present analysis is focused on this subsample of current smokers ($n = 979$).

Questionnaire

The Cancer KABP survey covered a wide range of topics related to cancer (beliefs about risk factors, efficiency of cancer care, attitudes towards cancer patients, access to cancer screening, risky behaviours, etc). We only describe here the questions that have been effectively used in the present analysis.

Current smokers were asked the following question: "According to you, smoking how many cigarettes per day is a smoker at risk of cancer because of smoking?" For a given response N , they were asked: "And according to you, after how many years is someone who smokes N cigarettes per day at high risk of cancer?" Other questions were specific to smokers: daily consumption, smoking duration (for daily smokers only), smoking light or ultra light cigarettes, planning to quit, personally considering being able to quit at any time. Both smokers and non-smokers were asked about their perceived level of information on health consequences of cigarette smoking (from "very well" to "very poorly" informed), personal fear of smoking related cancer ("yes" versus "no"), perception of smoking as a risk factor ("Cigarette smoking causes cancer: certainly, probably, probably not, certainly not"). Additional questions dealt with opinions that may fuel risk denial: respondents were asked if "Smoking is no more dangerous than breathing polluted air in urban areas", "Some people can smoke their whole life and never get sick," using a four point Likert scale (strongly agree, agree, disagree, strongly disagree). Respondents' sociodemographic characteristics, such as age, sex, education and occupation, were also collected.

Analysis

The sample was weighted by the inverse of the household size (since the probability of being asked to participate was inversely proportional to this size). We also used the 1999 French census to calculate weights in order for our sample to approximate the distribution of French adults aged 16 and more by age, sex, geographic area and size of town. Analyses were performed with weighted data.

We used the two questions related to thresholds for cancer risk perception, as well as reported daily consumption and smoking duration, to distinguish three groups of smokers according to their self perception of risk. The first two groups represent smokers who adhere to "risk denial" beliefs. Firstly, those who considered that smoking can cause cancer only for a daily consumption larger than their own reported consumption were labelled "smoking too few cigarettes to be at risk." Secondly, among smokers who indicated a threshold equal to or lower than their own daily consumption, those who considered that the risk of cancer becomes high only for a smoking duration higher than their own reported one were labelled "smoking for too few years to be at high risk." Finally, remaining smokers were gathered in a group labelled "self perceived high risk smokers," as they considered that smoking can cause cancer for a daily consumption equal to or lower than their own consumption, and that such risk is high for a smoking duration equal to or lower than their own smoking duration.

We used the Student t test and Pearson's χ^2 to compare these three groups of smokers with each other and with non-smokers (for beliefs, attitudes and practices toward smoking). We also used logistic regressions to compute adjusted odds ratios for comparing the three groups of smokers in terms of socio-demographic characteristics and daily consumption of cigarettes. Another logistic regression was performed to investigate factors associated with personal fear of smoking related cancer, including smokers' groups as covariates. The smoking duration was not introduced in these models as it was not measured for occasional smokers (those who reported smoking less than one cigarette per day). Finally, age and age² were both introduced in the models. This was an efficient and parsimonious procedure for capturing a potential non-monotonous effect of age (there is such an effect if one estimated parameter is positive and the other one is negative).

RESULTS

Description of the smokers' sample

On average, smokers were younger than non-smokers (mean age in years: 36.4 vs 47.7, $p < 0.001$). Smokers were also more frequently males (56%, vs 46% among non-smokers, $p < 0.001$). The educational level was similar among smokers and non-smokers (respectively 18% and 19% had their "baccalaureat," corresponding to high school graduation). However, smokers were more frequently manual workers (23% vs 19% among non-smokers, $p = 0.021$).

Perceptions of cancer risk and smoking behaviours and beliefs

Among current smokers, 44% belonged to the group who perceive themselves as "smoking too few cigarettes to be at risk" (see table 1). On average, respondents in this group considered that smoking can cause cancer only if one smokes at least 19.4 cigarettes per day (for an average reported consumption of 5.5 cigarettes per day), and that cancer risk becomes high for a smoking duration of 16.9 years or more (reported average duration: 16.7). An additional 20% of smokers were classified in the group who estimate "smoking for too few years to be at high risk" (average consumption threshold for cancer

Table 1 Smoking behaviours and beliefs according to perceptions of smoking related risk of cancer (France, 2005, Cancer KABP survey, n = 3820)

	Smoking too few cigarettes to be at risk (11%) (44% of smokers)	Smoking for too few years to be at high risk (5%) (20% of smokers)	Perceived high risk smoking (9%) (36% of smokers)	Non-smokers (75%)
	Mean (SD)	Mean (SD)	Mean (SD)	
Threshold for daily cigarette consumption associated with risk of cancer	19.4 (14.1)	7.0 (5.6)	4.3 (4.7)***	–
Threshold for smoking duration (in years) associated with high risk of cancer	16.9 (10.9)	23.5 (12.3)	7.9 (8.0)***	–
Daily cigarette consumption	5.5 (4.7)	14.4 (6.8)	15.1 (8.6)***	–
Duration of daily smoking (in years) (for daily smokers only)	16.7 (12.0)	12.5 (9.6)	22.6 (11.0) ***	–
	Percentage	Percentage	Percentage	Percentage
Smoking status:				–
Occasional smoker	27%	1%	4%	
Daily smoker	73%	99%	96%***	
She/he smokes light/ultra light cigarettes	51%	32%	44%***	–
Believes that she/he could quit at any time:				–
Certainly/probably	76%	42%	44%	
Probably not/certainly not	24%	58%	56%***	
She/he plans to quit:				–
Yes	78%	84%	82%	
No	22%	16%	18% NS	
Perceived level of information on health consequences of cigarette smoking:				
Very well informed	44%	32%	38%	38%
Rather well informed	44%	56%	51%	53%
Poorly/very poorly informed	12%	12%	11%	9%*
Cigarette smoking may cause cancer:				
Certainly	68%	79%	77%	72%
Probably	30%	19%	22%	25%
Probably not/certainly not	2%	2%	1%	3%***
Personal fear of smoking related cancer:				
Yes	51%	84%	78%	23%
No	49%	16%	22%	77%***
Smoking is no more dangerous than breathing polluted air in urban areas:				
Strongly agree, agree	70%	60%	69%	65%
Strongly disagree, disagree, don't know	30%	40%	31%	35%*
Some people can smoke their whole life and never get sick:				
Strongly agree, agree	74%	75%	78%	65%
Strongly disagree, disagree, don't know	26%	25%	22%	35%***

***Statistically significant at $p < 0.001$.**Statistically significant at $p < 0.01$.*Statistically significant at $p < 0.05$.

NS, not significant.

Test used: Pearson's χ^2 for categorical variables, Student t test for continuous variables.

risk: 7.0 cigarettes per day, vs 14.4 for reported consumption; average duration threshold for high risk: 23.5 years, vs 12.5 for reported duration). Finally, 36% of smokers "perceived themselves as being at high risk for cancer because of smoking" (respectively 4.3 vs 15.1 and 7.9 vs 22.6).

Respondents from the first group (smoking too few cigarettes to be at risk) were more likely to be occasional smokers (27%), while those in the third group (self perceived high risk smokers) reported the highest consumption and smoking duration. Smokers from the first group were also more prone to smoke "light"/"ultra light" cigarettes (51%), and to believe that they could quit at any time (76%). Moreover, most smokers (from 78% to 84%) planned to quit one day.

With regard to knowledge and beliefs, smokers from the first group were more prone to consider being very well informed on health consequences of cigarette smoking (44% vs 32 and 38%), but at the same time they were less likely to acknowledge that cigarette smoking may certainly cause cancer (68% vs 72 to 79%). When compared with other smokers, they were also less prone to report personal fear of being affected by a smoking related cancer (51%, vs 78% to 84%, and 23% among non-smokers).

Finally, a large majority of respondents agreed that smoking is no more dangerous than breathing polluted air in urban areas (especially in the first and third groups of smokers) and that some people can smoke their whole life and never get sick (78% in the third group of smokers). Both opinions were shared in similar proportions by non-smokers.

Factors associated with perceptions of cancer risk and personal fear of cancer

Factors associated with profiles of risk perception and personal fear of cancer are presented in table 2. The first two models compared the profiles of both groups who respectively believed that they "smoke too few cigarettes to be at risk" and "smoke for too few years to be at high risk" with that of the third group taken as a reference (self perceived high risk smokers). In both models, the sex effect was not statistically significant, and the estimated effect for age was not linear but monotonous: once controlled for other factors, older smokers were more prone to believe that they smoked too few cigarettes to be at risk, or that they smoked for too few years to be at high risk of cancer, and this effect became stronger at an older age. In addition, the

Table 2 Factors associated with perceptions of smoking related risk of cancer among French smokers (France, 2005, Cancer KABP survey, n = 979)

	Smoking too few cigarettes to be at risk versus "perceived high risk smoking"	Smoking for too few years to be at high risk versus "perceived high risk smoking"	Personal fear of smoking related cancer
	Adjusted odds ratios (logistic regression)		
Daily cigarette consumption	0.80***	1.02 NS	1.06***
Sex			
Male (ref)	1	1	1
Female	1.20 NS	0.87 NS	1.07 NS
Age	0.86***	0.82***	1.01 NS
Age ² /100	1.17***	1.17**	0.97 NS
Educational level:			
<baccalaureat† (ref)	1	1	1
Baccalaureat	0.70 NS	1.06 NS	1.27 NS
>baccalaureat	0.52*	1.74*	0.92 NS
Occupation††:			
Professional/manager/owner of a business (ref)	1	1	1
Office worker/clerical	1.02 NS	1.87*	0.63*
Student/other	1.33 NS	2.48*	0.46*
Manual worker	1.20 NS	2.19*	0.74 NS
Perceptions of smoking related risk of cancer:			
Smoking too few cigarettes to be at risk (ref)	–	–	1
Smoking for too few years to be at high risk			2.97***
Perceived high risk smoking			2.09***

***Statistically significant at p<0.001.

**Statistically significant at p<0.01.

*Statistically significant at p<0.05.

NS, not significant.

Test used: Wald's χ^2 for odds ratios.

†The "baccalaureat" marks the completion of the French high school programme.

††Last occupation for retired people.

more educated smokers and those who reported a higher daily consumption were less likely to consider that they smoked too few cigarettes to be at risk. On the contrary, a higher level of education was positively associated with considering smoking for too few years to be at risk, but once controlled for this effect this perception was correlated with a lower socioeconomic status.

With regard to personal fear of smoking related cancer, smokers who reported a higher daily consumption were more prone to express such fear. Sex, age and education had no significant impact, while this fear was more frequent among professionals/managers/owners of a business. Finally, once controlled for other factors, smokers who considered they smoked too few cigarettes to be at risk were far less likely to report such fear.

DISCUSSION

Main results

Among a random national sample of 3820 French people aged 16 or more, 26% reported smoking cigarettes at least occasionally. Such proportion of smokers is similar to that observed in previous surveys carried out in the French general population.²³ Most respondents, including smokers, considered they were well informed about the health consequences of cigarette smoking, and an overwhelming majority (98% among smokers) acknowledged that smoking causes cancer. Nevertheless, 44% of smokers considered that smoking can cause cancer only for a daily consumption higher than their own consumption, and an additional 20% considered that smoking related cancer risk only becomes high for a longer smoking duration than their personal one. Most smokers also agreed with the opinions that the cancer risk associated with

smoking is similar to that caused by air pollution, and that some people can smoke their whole life without getting sick. Those who considered they smoked too few cigarettes to be at risk were significantly less likely than the other smokers to report a personal fear of smoking related cancer.

Limitations of the study

Some limitations of the present study must be acknowledged before discussing these results. Firstly, about 15% of French households have only cellular phones, and in these households the smoking prevalence is known to be higher than among the rest of the population.²⁴ This phenomenon may have introduced some selection bias in our sample as we only selected fixed phone numbers. However, this bias is probably small: in a previous French survey, inclusion of households exclusively equipped with cellular phones only increased the observed prevalence of smokers for about 1%.²⁴ Secondly, accordingly to the conventional procedure in France, selected households were forewarned by a letter announcing the survey. This may have introduced a participation bias: some smokers may have refused to participate because they may feel less comfortable about answering questions about their habit. However, this letter only stipulated that the survey was about health issues, with no further details.

Thirdly, questions dealing with health related smoking risks focused on cancer risk, therefore neglecting the association of smoking with other health risks such as cardiovascular diseases. Fourthly, we only used two questions to investigate smokers' self exempting beliefs while a few previous studies had documented these beliefs using a more extensive set of questions.^{2 17–19} Fifthly, even if interviews were carried out by professional interviewers who were instructed to ask questions

in a neutral way, social desirability effects may still have occurred; these effects may, however, have been limited by the fact that questions related to cancer risk were asked after questions about actual smoking behaviour of respondents. Finally, a closed ended questionnaire prevents respondents from qualifying or justifying their responses, so we have certainly missed some aspects of smokers' risk perceptions that could have been better captured through the use of qualitative methods.

The variety of risk denial among smokers

Nevertheless, the questionnaire also contained some open questions. For example, smokers had the opportunity to detail the reasons why they did not fear smoking related cancer.²³ Some of them spontaneously expressed the feeling that they were "immunised" against cancer either for genetic and family reasons ("no antecedents of cancer in my family") or simply because of good fate ("I am a lucky person"). Other respondents explicitly referred to supposedly "protective" behaviours ("I clean up my lungs with homeopathy and osteopathy," "I smoke outdoors," "I avoid blond cigarettes"). A number of smokers simply quoted reasons for underestimating the danger of smoking ("cancer mixes many causal factors and smoking is only one of them"), or did not fear smoking related cancer because they planned to quit ("soon," "before it is too late" or "before starting a family"). Similar self exempting beliefs have been endorsed by significant proportions of smokers in various studies using closed ended questions on these topics.^{2 17-19} For example, in 1991, 32% of Australian smokers agreed that "many people who smoke all their lives live to a ripe old age,"¹⁷ and in 2002 24% agreed that "more lung cancer is caused by such things as air pollution, petrol, and diesel fumes than by smoking."¹⁸ Our results confirm that risk denial is quite widespread among smokers, and that it can take a number of different forms.

The failure of the prohibition of light/ultra light descriptors

Our study also illustrates the failure of the prohibition of "light and "ultra light" cigarette brand descriptors, that has been effective in France since 2003. Indeed, despite this prohibition, in our survey that was carried out two years later (2005), nearly half of French smokers reported smoking "light"/"ultra light" cigarettes. Since the 1970s, tobacco companies have developed a system of colour codes on their cigarette packages (for example, gold/blue for "lights," silver/light blue for "ultra lights"). Until today retailers and consumers keep on using these "light"/"ultra light" colour coding descriptors in spite of the fact that they have disappeared from the cigarette packages. Our study however illustrates some success of French prevention campaigns focused on the issue of passive smoking. Indeed, 23% of non-smokers reported personal fear of smoking related cancer: when they asked to justify this fear with an open question, the majority of these respondents mentioned their personal exposure to passive smoking.

Smokers' age, education and risk denial

As found in previous studies, older and less educated smokers were more prone to risk denial.^{18 19 25 26} However, it remains unclear whether the relation between risk denial and older age should be interpreted in terms of a "generation effect" or alternatively as a pure "age effect." In favour of the interpretation by reference to cultural differences between generations, there is the fact that older smokers have started smoking before the 1980s, when smoking was widely accepted and heavily supported by advertising and smoker reassurance through media campaigns.^{18 20} However, risk denial can be

interpreted as a learnt cognitive skill strengthened by past consumption and acquired all along the smokers' "moral career."¹⁹ The fact that older smokers are more prone to deny the risks of smoking may therefore be interpreted as a consequence of having survived to a great age despite being a smoker (while other smokers in the same generation have already died).

The relation between risk denial and a lower level of education reflects the general trend towards increasing social inequalities in smoking behaviours that has been observed in most developed countries.²⁷⁻²⁹ Less educated people may be less sensitive to prevention campaigns or they may less be able to correctly interpret preventive information. Other explanations may be related to the fact that people with the lowest socioeconomic status are often more likely to distrust information spread by health authorities.¹⁶

Risk denial: a functional and convincing cognitive tool?

More generally, there is an urgent need to better understand how smokers shape their risk denial, as self exempting beliefs may deter them from quitting their smoking habit.^{18 19 30} Social psychology has already stressed the practical function of risk denial for the concerned individuals: it reduces the cognitive dissonance experienced by smokers and alleviates their anxiety.³¹ This function is illustrated by our results, as smokers who considered they smoked too few cigarettes to be at risk were far less prone to fear smoking related cancer. Sociology gives additional explanations for the underlying rationale that sustains risk denial.³² Risk denial cannot be reduced to an attempt by irrational individuals prone to self delusion to justify their own behaviour. People engaged in a daily activity that is now labelled as "unhealthy" by the majority of society and by the media need to endorse convincing self exempting beliefs to reassure themselves.²¹ In our study, smokers who considered they smoked too few cigarettes to be at risk were indeed "lighter" smokers (they smoked an average of 5.5 cigarettes a day, and 27% were occasional smokers). These respondents had some subjective reasons to feel relatively safe, even if they were of course objectively "wrong" in an epidemiological and medical sense.

Risk denial may also be fuelled by peer experience: most smokers refer to the case of someone they personally know who was a heavy smoker but nevertheless lived to a very old age without experiencing any smoking related disease. Information spread by the media, including results from epidemiological studies, may also paradoxically be used by smokers as a point of departure for risk denial. This was clearly the case in our survey for smokers' references to current growing concerns about the public health burden attributable to air pollution. This phenomenon is very likely to persist in the future: in December 2006, several electronic and printed French media heavily reported about a recent epidemiological study using titles like "exercise may reduce risk of lung cancer for smokers."³³

Implications for anti-tobacco policies

Our study has some implications for anti-tobacco policies. Firstly, risk denial does not simply reflect a lack of knowledge and information about tobacco related health risks, thus prevention interventions should better take into account the fact that many smokers are already equipped with convincing beliefs that support their unhealthy habit. In the future, tobacco control messages should specifically address these smokers' self exempting beliefs, especially those who minimise risk by explicitly or implicitly referring to the existence of consumption and duration thresholds for cancer risk, or to other risk factors for cancer such as air pollution. In addition,

What this paper adds

What is already known on this subject

- Past studies on smokers' risk perception have produced mixed results, but many of them conclude that smokers are not fully informed about the potential harm of smoking because they show unrealistic optimism and endorse risk denial beliefs.
- Nevertheless, smokers may be unfamiliar with estimating a numerical risk or comparing one's risk with someone else's risk, and little attention has been paid to factors associated with smokers' risk denial.

What this study adds

- Most smokers consider they are smoking too few cigarettes, or for too few years, to be at risk for cancer. Smokers' risk denial does not simply reflect lack of information, and it can take very different forms.
- Fully informing smokers about smoking risks requires more than providing them with detailed information: it may necessitate changing the way they process information to produce beliefs.

because accurate epidemiological information may indeed be reinterpreted at the individual level for shaping risk denial, health authorities and scientists may be more cautious about the way they communicate about the results of epidemiological studies in order to limit such unintended adverse effects.

Secondly, it is frequently claimed that smokers initiate and persist in their behaviour because they did not have access to a fully adequate information about the risks involved.^{2 34 35} In a stimulating paper, Simon Chapman and Jonathan Liberman distinguished four levels of information about smoking health related risks: having heard that smoking increases health risks; being aware that specific diseases are caused by smoking; accurately appreciating the meaning, severity and probabilities of developing smoking related diseases; and personally accepting that the risks inherent in other levels apply to one's own risk of contracting such diseases. According to these authors, only smokers who have reached the fourth level should be considered fully informed.³⁶

From a sociological point of view, that is rather supported by the results of our survey, information is only the raw material of beliefs: it is frequently altered and distorted to fit previous beliefs and behaviours. Thus "fully informing" smokers about their risks requires much more than providing them with more detailed information. "Fully informing" smokers should rather mean to effectively prevent them from engaging in many cognitive processes that fuel underestimation of risk: comparing themselves to other smokers, comparing smoking risks to other hazards, claiming to control their smoking risks in various ways, and so on. In other words, "fully informing" smokers necessitates changing the way they process information to produce beliefs. Of course, fulfilling this goal is probably too ambitious for prevention information programmes, but it highlights the need to better understand the non-informational aspects involved in smokers' risk perception and risk denial.

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